

**Right-of-Way  
Vegetation Management Plan (VMP)  
For**



**Brookfield Renewables Bear Swamp Project**

## **TABLE OF CONTENTS**

	<u>Page</u>
I. INTRODUCTION	1
II. GOALS AND OBJECTIVES	1
III. IDENTIFICATION OF TARGET VEGETATION	2
IV. METHODS OF VEGETATION MANAGEMENT AND RATIONALE FOR USE	3
V. JUSTIFICATION OF HERBICIDE APPLICATION	5
VI. IDENTIFICATION OF SENSITIVE AREAS AND CONTROL STRATEGIES PROPOSED FOR SENSITIVE AREAS	8
VII. OPERATIONAL GUIDELINES FOR APPLICATORS	16
VIII. INTEGRATED VEGETATION MANAGEMENT PROGRAM	21
IX. ALTERNATIVE LAND USE PROVISIONS OR AGREEMENTS MINIMIZING THE NEED FOR HERBICIDES	23
X. REMEDIAL PLAN TO ADDRESS SPILLS AND RELATED ACCIDENTS	24
APPENDIX A	
Identification and qualifications of individuals developing and submitting plan	
APPENDIX B	
333 CMR 11.00: Rights-of-Way Management	
APPENDIX C	
Massachusetts Department of Environmental Protection (DEP) and DAR list of recommended herbicides for use in sensitive areas within rights-of-way.	
APPENDIX D	
Glossary of terms	

## **I. INTRODUCTION**

This Vegetation Management Plan (VMP) describes the Brookfield Renewables Bear Swamp Project integrated vegetation management program for their 0.82 mile double 230KV transmission ROW including lower yard, 1.4 mile 34.5 KV ROW, Fife Brook Dam and 4 Dikes and spillway on the Upper Bear Swamp Reservoir. This plan covers the 5 year period from 2016 through 2020 in compliance with the Commonwealth of Massachusetts 333 CMR 11.00, Right of Way Management regulations. These Facilities are all part of Brookfield Renewables Bear Swamp Project located in the towns of Florida and Rowe Mass.

### **ABOUT THE BEAR SWAMP PROJECT**

The Bear Swamp Project (FERC No. 2669) is located along the Deerfield River in Berkshire and Franklin counties, in the Commonwealth of Massachusetts towns of Rowe and Florida. The project was commissioned and placed into service in 1974, and includes both the Bear Swamp Pumped Storage Development and the Fife Brook Development.

#### **Bear Swamp Pumped Storage Development**

The Bear Swamp Pumped Storage Development generally consists of:

- An upper reservoir retained by four dikes and an emergency spillway;
- A submerged inlet/outlet structure and associated tunnel which bifurcates into two penstocks;
- An underground powerhouse containing two reversible Francis-type pump-turbine units and motor-generator units with a combined capacity of 600 megawatts;
- Two tailrace tunnels leading to an inlet/outlet structure in the lower reservoir; and
- A lower reservoir (Fife Brook impoundment) formed by the Fife Brook Dam on the Deerfield River.

#### **Fife Brook Development**

The Fife Brook Development generally consists of:

- The Fife Brook Dam and impoundment, which is common to both the Bear Swamp Pumped Storage and Fife Brook developments;
- A tainter gate spillway structure;
- A concrete intake structure; and
- A single penstock leading to a concrete powerhouse containing one conventional Francis turbine-generator unit with a capacity of 10 megawatts.

## **II. GOALS AND OBJECTIVES**

This section summarizes the goals and objectives of this vegetation management plan.

### **A. Goals of Vegetation Management Plan**

The primary goal of this Vegetation Management Plan (VMP) is the control of vegetation and establishment of standard operating procedures to ensure the maintenance of safe and uninterrupted electric service through its transmission line rights-of-ways and hydroelectric facilities. Physical and visual access must also be assured in order to permit routine and emergency line maintenance and operations which are essential to preserve safety, continuity and reliability of service.

This plan is a guiding document which provides structure and sensibility to the Yearly Operational Plans (YOP's). A YOP will be prepared each year to describe the detailed vegetation management operation for the calendar year consistent with the terms of the VMP.

### **B. Objectives of Vegetation Management Plan**

The principal objective of the VMP is to selectively eliminate that woody vegetation which may potentially short circuit overhead conductors or significantly restrict physical or visual access on the right-of-way. This management program will accomplish that objective at the lowest cost with due regard for worker safety, protection of public health and without unreasonable adverse effects on the environment; including the protection of sensitive areas. Selective control benefits wildlife habitat for many species of animals by encouraging plant communities that provide food and cover. The program is also designed to maintain acceptable appearance of the right-of-way and to minimize erosion by allowing the development of low shrubs and ground cover. The low shrubs and ground cover inhibit the re-establishment of target tree species.

The objective on the dams included in the VMP is to maintain integrity of the facilities by preventing roots of vegetation compromising the facility and enable visual inspection of the facilities.

The foregoing will be accomplished in full compliance with all applicable state and federal laws and regulations.

### **C. Sensitive Areas**

Special protection is afforded sensitive areas in which public health, environmental or agricultural concerns warrant special protection to further minimize risks of unreasonable adverse effects. Herbicide use is limited near

public and private water supplies, standing or flowing water, wetlands, and agricultural and habitat areas.

D. Public Involvement

Public involvement is imperative to the development of a vegetation management plan. Regulatory procedures have been established which guarantee all interested parties ample opportunity for input and review. In total, this vegetation management plan provides a comprehensive and integrated framework which protects the environment and the health, safety and welfare of the Citizens of the Commonwealth.

E. Location of Bear Swamp Project

The Bear Swamp Project (FERC No. 2669) is located along the Deerfield River in Berkshire and Franklin counties, in the Commonwealth of Massachusetts towns of Rowe and Florida.

**III. IDENTIFICATION OF TARGET VEGETATION**

Electric Transmission ROW's

The primary objective of electric utility vegetation management is the selective control of those woody plants capable of growing tall enough to interfere with the conductors, access and or inspection. This section identifies this tall-growing, "target vegetation" by plant growth characteristics as related to its location on transmission or distribution rights-of-way.

A. Plant Species

For the purposes of electric utility vegetation control, plant species are generally divided into two groups, undesirable species capable of interfering with the conductors or access, and desirable species which normally cannot. It is the contractor's responsibility to be knowledgeable about and to instruct his crews in the identification of desirable and undesirable species and the various control techniques necessary for integrated vegetation management. Electric company personnel manage the contractors performing woody vegetation control, and ensure that contract conditions are met. These groups are defined below:

1. Undesirable Species

Undesirable species include trees, tall maturing shrubs, and vines. Trees are woody plants normally maturing at 20 feet or more in height, usually with a single trunk, un-branched for several feet above ground and with a definite crown. Tall maturing shrubs are woody plants maturing over 12 feet but less

than 20 feet in height and presenting a generally bushy appearance because of their several erect spreading or prostrate stems. Undesirable tree species include, but are not limited to, poplar (*Populus* spp.), white pine (*Pinus alba*) and red maple (*Acer rubrum*) which are capable of growing into the conductors. Tall maturing shrubs include, but are not limited to, sumac (*Rhus* spp.), speckled alder (*Alnus rugosa*), and buckthorn (*Rhamnus* spp.). Woody vines such as wild grape (*Vitis* spp.) and oriental bittersweet (*Celastrus orbiculatus*) are also controlled when they risk electric reliability by climbing structures, poles and guy wires.

## 2. Desirable Species

Desirable species include low maturing shrubs, ferns, grasses, and herbs. Low maturing shrubs are woody plants normally maturing no taller than 12 feet in height and presenting a generally bushy appearance because of their several erect spreading or prostrate stems. Most shrubs such as mountain laurel (*Kalmia latifolia*), highbush blueberry (*Vaccinium corvmbosum*) and hazelnut (*Corvlus americana*) usually cannot grow into the conductors and are normally preserved and encouraged to grow. Non-woody plant species such as ferns, grasses, herbs and wildflowers benefit from the reduced competition for space and are allowed to flourish.

The following is a partial list of the most common shrub species that are normally preserved.

Hazelnut	Gray Dogwood	Juniper SPP
Viburnum SPP	Sweetfern	Bayberry
Spicebush	Huckleberry	Lowbush Blueberry
Pinxterbloom	Azalea	Mountain laurel
Redosier	Dogwood	Highbush Blueberry

### Target Vegetation for Electric Generation Facilities and Equipment Yards

There are some instances for example in rip rap areas on dikes and dams and in electric facility yards where there is a zero tolerance for any vegetation and all vegetation will be controlled in these areas.

Twenty five feet from the toes of all dams and dikes only non woody plant species will be allowed to remain.

## **IV. METHODS OF VEGETATION MANAGEMENT AND RATIONALE FOR USE**

This section describes the intended methods of vegetation management and rationale for use, including vegetation control techniques, equipment proposed for use, timing and other control procedures. An integrated approach to vegetation management has been developed which minimizes the use of herbicides through a balanced mix of cultural practices, mechanical control, and a carefully planned program of chemical control. State of the art techniques, time tested methods, and a low input approach to vegetation control

are incorporated into an innovative and interdisciplinary plan. Above all else, a major commitment is made to the protection of human health and safety, and the prevention of unreasonable adverse effects on the environment. Vegetation control is scheduled so the right-of-way is maintained as necessary to ensure the integrity of the electrical system.

A. Foliar herbicide

Description: A herbicide mixture is applied to leaves of individual, undesirable plants. Application is usually made with hand-pump or motorized "backpack" low-pressure sprayers. Since less herbicide mixture is used in the "low volume foliar" method than in the "foliar" method, the mix contains a higher concentration of herbicide. However, an equal amount of the active ingredient is applied to the target plants in order to maintain the minimal herbicide label rate to control the target plants.

Uses: Useful in general and some sensitive areas on individual targets less than 12' in height, and where terrain precludes the use of heavy equipment.

Pros: Efficient, effective method of selectively controlling individual plants.

Cons: Limited application season (apply when plants are in full leaf), weather dependent, efficiency is lost in areas with a high density of undesirable plants.

B. Basal herbicide

Description: A herbicide and carrier is applied to lower 12" of individual stems. Applications are made with hand operated low pressure backpack equipment.

Uses: Used in general and some sensitive areas.

Pros: Applications can be made year round if the root collar is exposed, little or no spray drift.

Cons: Basal applications are generally inefficient in medium to high stem-density areas. Volatility may be a problem in summer heat.

C. Cut stump herbicide

Description: A herbicide is applied directly to the cambium layer of freshly cut stumps. Applications may be made with a hand-held spray bottle, hand-operated sprayer, or a paint brush. Usually done in conjunction with manual or mechanical cutting.

Uses: Used in general and some sensitive areas (especially where aesthetics is a concern), where undesirable brush has been mechanically cut.

Pros: Applications can be made year round, little or no spray drift, no visual impact (no brownout).

Cons: Not effective in high density areas where cut stumps are small, or cannot be found.

D. Mowing

Description: Brush is mechanically cut using a (large) machine with a cutting head attached to a large all-terrain rubber tired or tracked vehicle

Uses: Used in areas accessible to large motorized vehicles, especially in areas of high density and/or tall undesirable stems.

Pros: Can be performed year-round, excellent way to re-establish control of overgrown areas.

Cons: Poor visual impact (debris and mangled roots/stems left), not good in rocky, hilly, residential, or wet areas, tends to be non-selective (cuts desirable weeds/shrubs/grasses as well as undesirable species), eliminates wildlife habitat, does not control root system, promotes aggressive re-sprouting.

E. Hand-cutting

Description: Targeted vegetation is mechanically cut using chain or brush saws or hand tools.

Uses: Used in inaccessible, residential, and some sensitive areas.

Pros: Can be performed year-round low visual impact; highly selective.

Cons: High cost, does not control root system, promotes aggressive re-sprouting

F. Cultural Practices

Description: The development of stable, low-growing native vegetated communities to prevent the establishment of undesirable tree, shrub and invasive species

Uses: Any area where Integrated Vegetation Management (IVM) can effectively control the undesirable target vegetation and promote the low-growing native plant species.

Pros: Results in less maintenance in future years and reduces amounts of herbicide required for the desired level of control.

Cons: Requires adequate input of IVM to obtain the stable, low-growing state



## V. JUSTIFICATION OF HERBICIDE APPLICATIONS

The Company's VMP accomplishes the overall goal of continuous and reliable electrical service at a reasonable cost to its customers while placing primary importance on health, safety and environmental protection. Herbicides used on rights-of-way reduces unreasonable adverse effects to health and the environment when used in accordance with label directions. These herbicides are regulated by the U.S. Environmental Protection Agency and approved for use in Massachusetts by the State Department of Agricultural Resources (DAR). Approved herbicides are applied by contractors that are licensed pesticide applicators and in accordance with herbicide label directions and precautions. In addition, Company policy requires compliance with all applicable federal and state laws and regulations.

This section compares the relative benefits of herbicide control with other methods and describes why herbicides are an essential part of an effective vegetation management program.

### A. Regulation of Stem Density and Plant Composition

Selective herbicide application provides significant advantages in decreasing the density of target vegetation and encourages the development of lower growing, native plant communities. A long-term reduction in the number of tree stems can be achieved by selectively treating only those undesirable species capable of interfering with the conductors and access. Herbicides are used which normally provide total control of both the above ground portion of target vegetation and the root system to prevent re-sprouting.

Compatible plant communities are developed by controlling re-growth of trees and occasionally tall-growing or invasive shrubs, and encouraging desirable species to dominate the right-of-way. Reducing undesirable plant competition for space allows low maturing shrubs, grasses, ferns, wildflowers, and herbs to spread into those areas previously occupied by target vegetation. The resulting dense low growing plant cover helps inhibit the germination and development of tall growing tree seedlings back onto the right-of-way. Compatible plant communities are thereby established which have an increased desirable species component and decreased undesirable component. In this manner, selective herbicide treatments tend to minimize the use of herbicides by generally reducing the number of target stems requiring control and potentially extending the time interval between treatments since the fastest growing, tallest maturing target species are controlled or eliminated.

### B. Wildlife Habitat

Selective herbicide applications significantly enhance wildlife habitat through the development of a complex, relatively stable plant communities. Selective use of

herbicide develops an environment and edge habitat beneficial to a wide variety of wildlife species. Large and small mammals, songbirds, raptors and a multitude of other animals are known to use these rights-of-way for food, cover and natural corridors of travel.

C. Economics

Economics refers to the costs of the various management techniques and the effectiveness of a particular method in controlling target species. Since effective control of target species is paramount to successful vegetation management program, optimum control is that which is most cost effective over the long term.

A vegetation management plan based solely on cutting is becoming cost prohibitive. Hand cutting or mowing without the benefit of herbicides allows the root systems of cut-off sproutable stumps to remain alive. Dormant or adventitious buds located on the root or stumps quickly develop into sprouts, often during the same year of cutting. Instead of a single stem which existed prior to cutting, a cluster of sprouts soon becomes established. Since a developed root system is already present, the growth rate of the newly formed sprouts is much faster than the normal growth rate of the tree. In fact, dense sprouts approximately 7-10 feet tall have occurred during the first full growing season immediately following cutting.

Hand cutting or mowing program require repeated re-clearing of brush due to re-sprouts with a one-time cost of approximately 1 to 5 times that for one herbicide application. This cost multiple is compounded further in that cutting must be performed 2 to 3 times more often than selective herbicide treatments. While warranted under certain conditions (e.g. in restricted sensitive areas, when weather is not appropriate, and when woody vegetation is too tall to herbicide treat effectively), the high per acre cost of cutting, lack of sprout control, and the necessity for more frequent maintenance reduce the long term cost effectiveness of cutting without herbicide treatment.

D. Erosion Control

A well-established, low-growing plant cover as provided by selective herbicide use also serves to control erosion by holding soil against wind and water movement. Conversely, under certain site conditions continued non-selective cutting without the benefit of herbicides can leave the ground bare and vulnerable to soil losses.

E. Noise and Air Pollution

Reliance on cutting methods would result in increased noise and air pollution as compared to herbicide control. Since crews have to return more frequently for cutting, noise pollution and exhaust from vehicles and brush cutting equipment are

a normal consequence. Also, fuel consumption for equipment increases.

F. Social Benefits

A variety of social benefits may be attained by managing vegetation through selective herbicide control. Buffer zones may be left to screen the public's view of the right-of-way.

As discussed in Article V.A, Regulation of Stem Density and Plant Composition, selective herbicide treatment tends to reduce the number of target stems requiring control. An integrated vegetation management program including selective control, normally results in less alteration of the existing plant community as compared to non-selective herbicide treatment or mowing. This generally decreases the use of herbicides and minimizes the potential for adverse effects on human health and the environment.

An integrated approach to vegetation management, including the prudent use of herbicides where appropriate, provides multiple use benefits. Opportunities for wildlife, recreation, nature study and aesthetic values such as viewing plants and animals may coexist when they do not interfere with safety and the operation of the right-of-way. In addition, agriculture, residential, and industrial land uses extend onto the Company's rights-of-way.

G. Integrated Vegetation Management

While there are several methods of controlling target vegetation, under certain site conditions the use of herbicides is not appropriate and cutting operations are conducted without them. Also, handcuffing and mowing have a certain range of site conditions under which they are applicable. Conditions which determine the control technique include sensitive areas, weather, visual aesthetics, time of year, height and/or density of vegetation, access, etc. Since these factors vary from one right-of-way to the next, the proper control technique must be suited to the actual site conditions. These factors are recognized in selecting the appropriate control technique applicable to the right-of-way. A full description of the Company's Integrated Vegetation Management program is provided in Article VIII.

H. Safety

Most of the Right of Way in on steep rocky slope and dam are steep covered in rip rap. By using herbicides to control vegetation employees will not have to traverse this terrain with chain saws to cut vegetation that will re-sprout and need to be cut next cycle.

I. Historical Vegetation Management

The Bear Swamp project until 1998 was owned by New England Power part of

New England Electric System, they would later become National Grid. The transmission ROWs was included in there YOP and managed with practices from there VMP. In 1998 the project with its rows was sold when New England Power sold all of its generation assets. Brookfield Renewable purchased the project in May of 2005. From 1998 there has been no consistent maintenance plan. The goal of Brookfield Renewables is to get the right of way back to a low growing plant community thru sound IVM practices that can support beneficial habitat while coexisting with the delivery and production of electricity.

## **VI. IDENTIFICATION OF SENSITIVE AREAS AND CONTROL STRATEGIES PROPOSED FOR SENSITIVE AREAS**

This section defines sensitive areas encountered along rights-of-way, provides references and sources for identifying sensitive areas, outlines the method used to identify sensitive areas, and lists the control strategies proposed for sensitive areas.

The Massachusetts Department of Environmental Protection (DEP) and DAR have developed a list of recommended herbicides (See Appendix C) for use in sensitive areas within rights-of-way. These herbicides are characterized by their low: toxicity, mobility, and persistence. The Company will use only chemicals from this list when treating in sensitive areas.

In 1991, following a study of the impacts of right-of-way vegetation management on wetlands, the DAR determined that integrated vegetation management, using herbicides recommended for sensitive areas does not pose an unreasonable adverse impact to wetlands. In addition, the DAR required a second study for the purpose of collecting data on the environmental fate of herbicides. In 1995, the DAR issued its final determination that an integrated vegetation management program, incorporating the elements listed in VI.D.5.f. will "result in less impacts to wetlands than exclusive use of mechanical control methods".

### **A. Definition of Sensitive Areas**

Sensitive areas are defined in 333 CMR 11.02 as "any areas, within rights-of-way, including but not limited to the following, in which public health, environmental or agricultural concerns warrant special protection to further minimize risks of unreasonable adverse effects:

- (a) within the primary recharge area of a public drinking water supply well
- (b) within four hundred (400) feet of any surface water used as a public water supply
- (c) within one hundred (100) feet of any appropriately marked private drinking water supply well
- (d) within one hundred (100) feet of any standing or flowing water

- (e) within one hundred (100) feet of any wetland
- (f) within one hundred (100) feet of any agricultural or habitat area."

The following table shows the "no herbicide treatment zone" and the surrounding "limited herbicide treatment zone" within each sensitive area type

B. Reference and Sources for Identifying Sensitive Areas

**Sensitive Area Restriction Guide (333 CMR 11.04)**

<b>Sensitive Area</b>	<b>No Spray Area</b>	<b>Limited Use Area</b>	<b>Where Identified</b>
Wetlands and Water Over Wetlands	Within 10 feet (unless provisions of 333 CMR 11.04(4)(c) are followed)	10 – 100 feet; 12 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	YOP Maps and identify on site
Certified Vernal Pool	Within 10 feet	10 feet to the outer boundary of any Certified Vernal Pool Habitat; 12 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	YOP Maps and identify on site
Public Ground Water Supply	Within 400 feet (Zone I)	Zone II or IWPA (Primary Recharge Area); 24 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	YOP Maps
Public Surface Water Supply	Within 100 feet of any Class A public surface water source	100 feet to the outer boundary of the Zone A; 24 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	YOP Maps
	Within 10 feet of any tributary or associated surface water body located outside of the Zone A	10 feet to the outer boundary of the Zone A; 24 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	
	Within 100 feet of any tributary or associated surface water body located within the Zone A of a Class A public surface water source		

<b>Sensitive Area</b>	<b>No Spray Area</b>	<b>Limited Use Area</b>	<b>Where Identified</b>
	Within a lateral distance of 100 feet for 400 feet upstream of any Class B Drinking Water Intake	Within a lateral distance of between 100 - 200 feet for 400 feet upstream of intake; 24 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	
Private Water Supply	Within 50 feet	50 – 100 feet; 24 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	In YOP well list and identify on site
Surface Waters	Within 10 feet from mean annual high-water line	10 feet from the mean annual high water line and the outer boundary of the Riverfront Area; 12 months must elapse between applications; Selective low pressure, using foliar techniques or basal or cut-stump applications	YOP Maps and identify on site
Agricultural and Inhabited Areas	N/A	0 – 100 feet 12 months must elapse between application; Selective low pressure, using foliar techniques or basal or cut-stump applications.	Identify on site
State-listed Species Habitat	No application within habitat area except in accordance with a Yearly Operational Plan approved in writing by the Division of Fisheries and Wildlife		YOP Maps

The following references and sources may identify the location of public ground water supplies, public surface water supplies, private drinking water supplies, and the general location of wetlands. Standing and flowing water, and agricultural and habitat areas are readily identified in the field.

1. Massachusetts Department of Environmental Protection (DEP) Watershed Maps (scale 1:25,000) and/or digital data layers; delineates the perimeter of public watersheds and the location of public wells.
2. Massachusetts DEP Wetland Restriction Maps (scales usually 1:1,000); approximately 15% of the State has been mapped; available from DEP, Division of Wetlands and Waterways.
3. Municipal Maps and Records (scales vary).

4. Regional Planning Agencies' 208 Water Quality Survey Wetland Maps (scales vary); not all planning agencies have copies.
5. U.S. Army Corps of Engineers (COE) Wetland Maps (scales vary); prepared for specific COE projects.
6. U.S. Fish and Wildlife Service National Wetlands Inventory Maps (scales 1:24,000 and 1:25,000); available from University of Massachusetts at Amherst, Cartographic Information Research Services.
7. U.S. Geological Survey Topographic Maps (scale 1:24,000); identifies major wetland areas.
8. Natural Resource Conservation Service Maps (scales vary); available for most communities.
9. William McConnell Land Use Maps (scale 1:25,000); delineates wetlands using aerial photos; available from the University of Massachusetts at Amherst, Dept. of Forestry and Wildlife Management (caution: some forested swamps not included in wetland classification).
10. DEP Wetland Restriction Maps (when available for western Massachusetts).
11. Wetlands Conservancy Program or UMass color infrared (1:22,000 scale) and black and white (1:5,000 scale) orthophotographs.
12. Maps of Estimated Habitat of State Listed Species published by the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP).



C. Method for Identifying Sensitive Areas and Wetlands

The following procedure will be used to identify right-of-way sensitive areas:

1. The appropriate references and sources will be consulted to determine the location of public and private water supplies.
2. Public water supplies will be designated on YOP maps.
3. Prior to application, the location of these public and private water supplies will be identified in the field with the aid of the Yearly Operational Plan, by a "point person" in advance of the treating crew.
4. Prior to application, the treating crew will identify standing and flowing surface waters, and agricultural and habitat areas in the field except as provided by Article 7. below.
5. Appropriate distances will be measured from sensitive areas to identify no herbicide treatment zones and limited herbicide treatment zones.
6. Public and private water supplies will be marked as specified in the Yearly Operational Plan. Sufficient distance will be maintained between the point person and treating crew to prevent any inadvertent application in sensitive areas. Application will cease in that area if adequate distance cannot be maintained.
7. The procedure listed in this article will be used to identify wetlands when non-sensitive area herbicides are used to control vegetation.
  - a. The appropriate references and sources will be consulted to determine the general locations of wetlands. Precise boundaries must be determined in the field.
  - b. Prior to application, individual(s) trained and experienced to be considered qualified to delineate wetlands will identify wetland boundaries based upon plant indicator species.
  - c. Wetland boundaries will be kept in permanent Company records indicating where 50% or more of the vegetation community consists of wetland plant species.
  - d. A "point person" in advance of the treating crew will measure appropriate distances from wetland boundaries to

identify no herbicide treatment zones and limited herbicide treatment zones. These areas will be marked as specified by the Yearly Operational Plan. Sufficient distance will be maintained between the "point person" and treating crew to prevent inadvertent application in the wetland. Application will cease in that area if adequate distance cannot be maintained.

D. Control Strategies for Sensitive Areas

The following vegetation control strategies shall be used for sensitive areas.

1. General Provisions for Sensitive Areas and Non-Sensitive Areas
  - a. Herbicides will be used in accordance with this Vegetation Management Plan and the Yearly Operational Plan. These documents will be carried at all times with the applicator.
  - b. Herbicide treatment is made only by applicators that are appropriately certified or licensed by the DAR.
  - c. No foliar applications of herbicides will be used to control vegetation greater than 12 feet in height.
  - d. No touch-up applications are carried out except under the following conditions:
2. Touch-up applications occur within twelve months of the date of approval of the YOP.
3. The DAR, Conservation Commission, Board of Health, and chief elected official of the municipality are notified by registered mail at least twenty one days prior to any application.
4. No more than 10% of the initially identified target vegetation on the Company's right-of-way in any municipality is treated and the total amount of herbicide applied in any one year does not exceed the limits specified by the label or YOP.
5. Sensitive Area Restrictions
  - a. A minimum of 24 months will elapse between herbicide applications in limited herbicide treatment zones of public ground water supplies, public surface water supplies, and private drinking water supplies.

- b. A minimum of 12 months will elapse between herbicide applications in limited herbicide treatment zones of surface waters, wetlands, and habitat and agricultural areas.
  - c. No more than minimum labeled rate of herbicide appropriate to the site, pest and application method will be applied in sensitive areas.
  - d. Herbicides recommended for sensitive areas and guidelines for their use will be followed in accordance with the DAR's list of "Approved" herbicides for sensitive areas on rights-of-way.
  - e. All other limitations placed on sensitive areas will be followed as provided by 333 CMR 11.04.
  - f. Wetlands Restriction based on the results of two ROW impact studies:
- 6. An integrated Pest Management (IPM) system, also known as Integrated Vegetation Management (IVM), as described in the Vegetation Management Plan and Yearly Operational Plan is utilized in wetland areas. The IPM system must, at a minimum, place emphasis on encouraging low growth plant species to discourage unwanted vegetation and, minimizing the frequency and amount of herbicide use by only controlling specific non-conifer tree species which will impact transmission line operation and access to the right of way.
  - 7. Herbicides may be applied by low volume foliar, basal, or cut stump methods in volumes not to exceed 5 gallons per application container. Foliar applications must include the use of appropriate drift reduction agents, and must not result in the off-target drift to non-target species. Basal and cut stump treatments may be conducted in those situations where the size of the vegetation, potential for off-target drift, or other considerations precludes the use of low-volume foliar applications. Cut stump and basal applications shall be restricted, when practicable, to periods when static ground water levels are low or otherwise when conditions are less susceptible to potential contamination.
  - 8. Herbicides are not applied to conifer species (pine, spruce, fir, cedar, and hemlock).
  - 9. Carriers for herbicides do not contain any of the following petroleum based products: jet fuel, kerosene or fuel oil. Carriers

will be subjected to review by the DAR and DEP through 333 CMR 11.04(1.d).

10. Only herbicides recommended by the DAR and the Environmental Protection Agency through CMR 11.04(1 .d) may be used in sensitive areas.
11. Herbicides may only be applied by hand operated equipment containing no more than 5 gallons of diluent.
12. All other restrictions within sensitive areas remain in effect. In accordance with 333 CMR 11.04(1)(c), no person shall apply herbicides for the purpose of clearing or maintaining a right-of-way in such a manner that results in drift to any areas within 10 feet of standing or flowing water in a wetland or area within 400 feet of a public drinking water supply well; or area within 100 feet of any surface water used as a public water supply; or area within 50 feet of a private drinking water supply identified under 333 CMR 11.04(2)(c)(3).
13. A minimum of twelve months must elapse between herbicide treatments. Only touch-up applications may be performed between twelve and twenty four months.
14. Approved Vegetation Management Plans and Yearly Operational Plans must be amended as needed to reflect the conditions of this determination.

E. Massachusetts Endangered Species Act

The Massachusetts Endangered Species Act, M.G.L. c. 131A, and regulations promulgated there under, 321 CMR 10.00, sets forth procedures for the listing of Endangered, Threatened, and Special Concern species native to Massachusetts, the designation of Significant Habitats for such species, and establishes rules and prohibitions regarding the activities which take species or alter their Significant Habitats.

To comply with the General Provisions, 321 CMR 10.00 Part 1, the Company will submit this VMP for review by the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP). The Company YOP will be submitted to the NHESP for review upon request of the NHESP. The Company shall take all practicable means and measures to modify right-of-way vegetation management procedures to avoid damage to state listed species and their habitats as per guidance and information provided by the NHESP.

Provisions of 321 CMR 10.00, Part II, allow NHESP to designate Significant Habitat on any land in the Commonwealth. The Company would be notified as an owner of interest in any Significant Habitat that incorporates right-of-way. No known designations have been made to date. Vegetation management activities within Significant Habitats require an Alteration Permit from the Director of the Division of Fisheries and Wildlife, 321 CMR 10.00, Part III. The Company will, when it becomes necessary, seek such a permit under the Coordinated Permit Review process of the Regulations, Section 10.38.

## **VII. OPERATIONAL GUIDELINES FOR APPLICATORS**

The Company's policy requires contracted applicators to comply with all applicable federal and state laws and regulations. That includes 333 CMR 11.00 Right-of-Way Management.

The product label is the permit under which the product can be marketed. The label is periodically updated and provides the most current information which is essential to the safe handling and application of the product. Use inconsistent with the labeling is punishable by fine and/or imprisonment.

This section provides a partial summary of operational guidelines as specified by federal and state training manuals, laws, and regulations applicable to right-of-way applicators. The best guideline in applying herbicides is for applicators to use their own awareness, good judgment and common sense.

### **A. Safety Precautions**

The following general safety precautions should be taken when handling and using herbicides:

1. Transporting Herbicides
  - a. Containers should be placed and secured so they do not tip over or bounce around, in an enclosed lockable compartment.
  - b. Do not transport food, feed, or people near herbicides.
  - c. Department of Transportation regulations and appropriate state and local laws and regulations must be followed when transporting herbicides across state lines.
2. Protective Clothing
  - a. Some herbicides require no protective clothing but common sense should be followed.

- b. Follow label precautions.
  - c. Wear protective spray clothes including a closely woven long-sleeved shirt, pants, or coveralls, shoes, and socks.
3. Exposure
- a. Do not work in spray, drift, or run off unless thoroughly protected.
  - b. Wash thoroughly before eating, drinking, or smoking.
  - c. Work in pairs to help identify poison symptoms.
  - d. Keep unauthorized people and animals out of the treatment area while treating.
  - e. Use proper application rates.
4. Personal Hygiene
- a. Immediately wash off any herbicide spilled on the body.
  - b. Change spray clothes daily.
  - c. Keep spray clothes separate from other clothing.
  - d. Wash spray clothes thoroughly.
  - e. Take a shower at the end of each day.
5. Herbicide Poisoning
- a. Keep herbicides out of the reach of children.
  - b. Inform your doctor which herbicide you use.
  - c. A well-equipped first aid kit should be available at the work site in case of emergency.
  - d. If poisoned, call an ambulance or Massachusetts Poison Information Center, (800) 222-1222 and administer proper first aid.

B. Filling and-Mixing

Applicators are most often exposed to harmful levels of pesticides during filling and mixing operations since concentrated forms are handled. The following steps should be taken to avoid accidental exposure to the applicator or harm to the environment.

1. Follow all label directions.
2. Keep animals and unauthorized people out of the filling/mixing area.
3. Herbicide concentrates may not be handled, mixed, or loaded on a right-of-way within 100 feet of a sensitive area.
4. Wear protective clothes, rubber gloves, hat, respirator, and goggles or face shield if specified on the label.
5. Change clothes immediately if concentrates are splashed or spilled on clothing.
6. Keep plenty of soap and water at your disposal for cleanup.
7. When pouring herbicides, keep your head well above the opening and position yourself so winds do not carry the pesticide into your face or body.
8. Carefully measure herbicides.
9. Use anti-siphoning devices such as check valves to prevent back flow of water into the filling source.
10. Do not allow the sprayer to run over when filling.
11. Triple rinse empty containers and utilize the rinsings whenever possible.
12. When mixing together two or more products, make sure they are compatible.

C. Equipment Calibration

The rate of delivery for each application technique is based primarily on the proper coverage of those plant parts specific to the treatment (i.e. uniform surface wetting without run-off for the basal technique). Proper rates of application depend upon the following parameters:

1. Proper herbicide mixture.

2. Proper distance between the sprayer and target plant.
3. Proper pump pressure.
4. Correct nozzle type and opening size.

Equipment should be kept in good working order. Leaking or faulty pumps, tanks, hoses, nozzles and fittings should be repaired at once.

D. Weather

Applicators must give weather factors due consideration in their decision to conduct spray operations on any given day or to continue when weather conditions become unsuitable. Rain water not only washes herbicides from target vegetation and reduces its effectiveness, but the resulting runoff could pose harm to the environment. High wind speeds increase the chances for drift to non-target plants, sensitive areas and the applicator. For these reasons, no herbicide shall be applied when the wind velocity is such that there is a high propensity to drift off target and/or during measurable precipitation.

E. Disposal

Surplus herbicides and empty herbicide containers shall be disposed of as described on the herbicide label.

To cut down on herbicide surplus, plan the spray operation so excess mix is not left over at the end of the day.

F. Record Keeping

The Occupational Safety and Health Act (OSHA) of 1970 requires employers of eleven or more employees to maintain records and prepare periodic reports concerning work related deaths, injuries, and illnesses. In the Commonwealth of Massachusetts, record keeping is required of all certified commercial applicators and licensed applicators. Operational records must contain the following information (as specified in 333 CMR 10.16):

1. Place of application
2. Date of application
3. The brand or registered name of the pesticide
4. The EPA registration number of the pesticide



5. The amount of pesticide applied
6. The purpose for which the pesticide was applied
7. Method of application
8. The persons certified or licensed by the DAR who participated in the planning and execution of the application
9. Accidents or incidents resulting from use of a pesticide which caused pollution
10. The amount of liability insurance carried and the name of the insurer
11. Any illnesses or injuries caused by or suspected to have been caused by pesticides and reported to the applicator. -

G. General For All Herbicides

1. Label Instructions - follow all label instructions and the following:
  - a. Designation of Approved Herbicide Mixture  
  
Designation of herbicide (including manufacturer and brand name), carrier and mixture to be used will be provided by the Owner's Representative before the work is started.
  - b. Restriction of Herbicide Treatment Application Due to Precipitation  
In the event of precipitation, herbicide treating shall cease, and shall not resume until stems and foliage are dry.
  - c. Specifically as Applicable to Basal Applications  
Treating shall be performed only when the stems are dry and clear down to the root collar.
  - d. Specifically as Applicable to Stem-Foliar Applications:  
Restriction of Application Due to Precipitation - In locations which are not sensitive areas, any treating done within twelve (12) hours before the start of precipitation may be retreated.
  - e. Specifically as Applicable to Stump Treatment Applications:

Work Period - Do not apply during periods of precipitation.

## **VIII. INTEGRATED VEGETATION MANAGEMENT PROGRAM**

Integrated Vegetation Management (IVM) operates on the principle that undesirable vegetation is best controlled through an interdisciplinary combination of chemical and non-chemical methods. This principle is put into practice on the Company's rights-of-way through a specialized herbicide program and cutting strategies designed to achieve long term selective, cultural, and natural control at the lowest cost to the electric customer without unreasonable effects on the environment and public health. This section describes these integrated approaches used to minimize the use of herbicides and yet effectively control target plant populations.

### **A. Cutting Without Herbicide Treatment**

As discussed in Section V, Integrated Vegetation Management, the use of herbicides is not appropriate under all conditions. Therefore, herbicide applications are not conducted in no herbicide treatment zones, and when weather conditions restrict herbicide application.

### **B. Cultural Control**

Perhaps most importantly, electric utility integrated management seeks to culturally control vegetation by regulating species composition and stem density. Selectively removing target tree species while leaving desirable low maturing shrubs results in a higher ratio of shrubs to trees and a long-term reduction in tree stem counts. By leaving desirable shrub species, a conscious attempt is made to encourage these plants through the subsequent reduction in competition for carbon dioxide, water, nutrients, and sunlight. Concentrating growth on these plants and maintaining thrifty, vigorous growth encourages their spread across the right-of-way. Cultural control relies on the concept that ecological principles can be used to control the natural stages of plant development. The interrelationships of nature are utilized along rights-of-way to establish relatively stable plant communities that tend to maintain themselves.

Some plants limit the available growing space for competing species through a process known as allelopathy. The roots of these plants, e.g. huckleberry and goldenrod, produce chemicals that are toxic to other plants.

Creating low growing plant cover slows the natural progression of plant succession to a climax stage by preventing the invasion and development of undesirable tall growing trees. Desirable shrubs are also encouraged

since they tend to be sun loving, shade intolerant plants which thrive in full sunlight. As low growing plant communities become more dense, the number of undesirable stems will be lower and the need for constant control of target vegetation is reduced.

The selection of desirable species allowed to remain on the site is another key to effective natural control. Control operations are based upon native species present and suited to the actual site conditions. For example, basal applications tend to favor low growing shrubs such as blueberry, while foliar applications favor ferns, grasses, and herbs. By managing existing relationships between various plants and the environment, control procedures can be prescribed to foster the natural development evident on the right-of-way.

C. Selective Application Techniques

Highly selective application techniques are used to apply diluted herbicide mixtures directly to target vegetation with precision. The basal techniques are used to apply small amounts of herbicides using sprayer wands held within inches of each individual stem. In the cut stump method, herbicide is applied only to the residual stump left after mechanical cutting. The amount of herbicide used in the foliar technique is minimized by proper spray nozzle pressure, large droplet size, spray adjuvants, and applications directed at individual tall-growing plants.

D. Selective Herbicides

A variety of selective herbicides are used which affect certain groups of plants with little or no affect on others. Limited spectrum herbicides are used to meet the particular vegetation and site conditions on the right-of-way. Some herbicides control broadleaved tree species while not affecting certain low maturing shrubs, grasses, and herbaceous plants. Other herbicides control broadleaved tree species but do not affect desirable grass species such as those found in lawns or some grain crops.

Adjuvants may be added to the herbicide mixture to help improve the performance of the active ingredient and reduce the chance of off-target drift.

Herbicides are normally mixed with a water or petroleum carrier and applied as a dilute mixture. In wetlands, either water or a refined petroleum product will be used as carriers. Fuel oil, jet fuel, and kerosene are not permitted for use as carriers in wetlands (See Appendix C).

E. Long Term Timing of Treatment

Proper timing of selective herbicide applications is important to the long

term planning of vegetation management. To insure reliability, vegetation maintenance is scheduled to preclude encroachment of target vegetation into the conductors as allowed by current funding levels.

With approximately 95 acres of cleared transmission line right-of-way, approximately one-third must be maintained each year to assure the integrity of the system. Although this relates to a normal three-year treatment interval for the right-of-way, fixed application schedules are avoided by on-site determinations of present site conditions. An assessment of the right-of-way is conducted to document the vegetation conditions (including the height and density of desirable and undesirable species), and other site conditions (such as environmental and visual sensitive areas) to determine if the vegetation maintenance schedule should be advanced or delayed.

F. Seasonal and Daily Timing of Treatment

Application crews adhere to strict procedures governing the seasonal and daily timing of selective herbicide applications. They include:

1. Basal techniques are used only when stems are dry and clear to the root collar. These methods are ineffective and consequently not used when the lower stem is either wet or covered with snow or ice.
2. Stumps are not treated during periods of precipitation.
3. Foliar techniques are normally used between June and early September after leaves are fully developed and while the plant is actively growing.
4. Herbicides are not applied when the wind velocity is such that there is a high propensity to drift off target and during measurable precipitation.

IX. **ALTERNATIVE LAND USE PROVISIONS OR AGREEMENTS  
MINIMIZING THE NEED FOR HERBICIDES**

This section describes the alternative land use options and agreements which minimize the need for herbicides on the Company's rights-of-way. The Company continuously evaluates alternative vegetation management methods. A brief description of these methods follows.

A. Land Use Provisions

A portion of the right-of-way has no brush requiring control due to land

usage. Herbicide treatment is not necessary where lawns, roadways, urban areas, industrial sites, and agricultural areas such as pastures, hayfields, and cornfields do not allow target species to interfere with the conductors or access.

B. Agreements

License agreements

This is an agreement between the Company and another party (an individual, state or local government agency, or corporation), regarding property owned by the Company. A party may enter into an agreement with the Company (through a Company Representative) which allows them to use Company owned land for their purpose (e.g., commercial or agricultural use) in exchange for some agreed to compensation. Certain land uses preclude or reduce the need for brush control. License agreements are negotiated on a case-by-case basis via the Company's Land Agent.

X. **REMEDIAL PLAN TO ADDRESS SPILLS AND RELATED ACCIDENTS**

This remedial plan is offered as a guide to proper procedures for addressing pesticide accidents. Since every incident is different, applicators must weigh factors specific to the situation and use their own judgment to decide the appropriate course of action. Because applicators normally carry only small amounts of herbicides, the potential for serious accidents is relatively small.

Federal and state statutes establish emergency response procedures that must be followed by the companies and their contractors in the event of a spill or related accident. Under the Federal Environmental Pesticide Control Act, it is the applicators legal responsibility to clean up pesticide spills resulting from their use and handling of the product. Applicators are liable for damages, subject to penalties, and obligated to clean up and decontaminate areas resulting from pesticide spills.

The Comprehensive Environmental Response, Compensation, and Liability Act 1980 (CERCLA) 42 U.S.C. §9601 et. seq., and the Federal Water Pollution Control Act (CWA) 33 U.S.C. §1251 et. seq. are aimed at eliminating the accidental discharge of oil and hazardous substances into the environment, providing for the cleanup of such substances, and establishing responsibility for costs of cleanup. CERCLA and CWA are implemented by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR §300 et. seq.

Massachusetts General Laws Chapter 21 E, the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, Section 3 authorizes the Massachusetts Department of Environmental Protection (DEP) to act to

secure the benefits of the CWA and CERCLA to the Commonwealth by promulgating and enforcing a Massachusetts Contingency Plan to "comport with and complement" the National Contingency Plan. The Massachusetts Contingency Plan, 310 CMR 40.000, establishes standards and procedures for the discovery of discharges, notification of DEP, assessment of the problem, and implementation of appropriate remedial response actions, as set forth in 310 CMR 40.500.

The Farm Chemical Handbook (published by Meister Publishing Co., Willoughby, Ohio), U.S. Department of Transportation "1987 Emergency Response Guidebook" (available from UNZ and Company, Jersey City, New Jersey), herbicide labels, and material safety data sheets provide reference information for the chemicals being used. Applicators should carry equipment for emergency action including sand or other absorptive material, broom, shovel, and heavy duty plastic bags or other leak-proof sealable container.

### **Identification and Qualification of Individual Developing and Submitting The VMP**

David O'Brien  
Lewis Tree Service, Inc.  
300 Lucius Gordon Dr.  
West Henrietta, NY.  
413 237-9870  
[DOBrien@lewistree.com](mailto:DOBrien@lewistree.com)

David has been involved with the field of IVM for over 20 years. He started leading crews in the field as a crew leader and now manages Lewis Tree Service, Inc. IVM and Transmission work in New England. A graduate of The Stockbridge School of Agriculture with a AA.S in Arboriculture and a BS from University of Massachusetts at Amherst in Urban Forestry. David hold certifications for herbicide application in all New England states and in a member if the Rights of Way Stewardship Council.

## **Links to additional Information**

333CMR 11.00

<http://www.mass.gov/eea/docs/agr/legal/regs/333-cmr-11-00.pdf>

Massachusetts Wetlands Protection Act

<http://www.mass.gov/eea/docs/dep/service/regulations/310cmr10a.pdf>

FAC -003-3

<http://www.nerc.com/files/FAC-003-3.pdf>

Notification of Vegetation Management Activities on Transmission Rights of  
Way

<http://www.mass.gov/eea/docs/dpu/cmr/220cmr2200.pdf>